



Basic Communicator Training

California Wing Civil Air Patrol
Communications Section



Course Objectives

- ☼ Involve more members in radio communications
- ☼ Enhance Emergency Services resources
- ☼ Qualify members for the issuance of a Radio Operator Authorization (ROA) card

Why This Course & What's Next ?

- ☼ Quickly qualify members for ROA
- ☼ What can I do as a Basic Communications User?
 - Operate CAP radios
 - Continue training to become a proficient operator
- ☼ Advanced Communications User
 - Classroom session with written test
 - Qualified for Radio Station License
 - Continue training to become a radio communicator

Learning Objectives

Upon completion of this course, you will be able to:

- ☉ Define the mission of CAP communications
- ☉ Define the purpose of CAP communications facilities
- ☉ Define CAP's relationship with the NTIA and the FCC
- ☉ Explain fundamental radio communication theory

Learning Objectives (cont.)

- ☼ Explain fundamental repeater theory and operation
- ☼ Explain the types of radios used in CAP communications
- ☼ Explain the functions of radio controls
- ☼ Describe the types and uses of call signs

Learning Objectives (cont.)

- ☼ Explain the principles of Mission Communications and Emergency Operations
- ☼ Demonstrate knowledge of Prowords
- ☼ Demonstrate knowledge of the Phonetic Alphabet and Numerals
- ☼ Explain Net Operations
- ☼ Demonstrate correct radio operation



Mission of CAP Communications

- The mission of the CAP Communications Program is to organize and maintain a reliable, nationwide, point-to-point, air-to-ground, and ground mobile radio capability in support of the missions of CAP.

CAPR 100-1



Purpose of CAP Communications

- Primary Purpose of a CAP Communications Facility:
 - To provide the commander with the means for controlling his/her units and their activities.
- Additional Purpose of a CAP Communications Facility:
 - To provide the commander at each echelon the ability to communicate with superior and subordinate commanders.

National Telecommunications and Information Agency (NTIA)

- ☉ The federal agency responsible for the regulation and coordination of telecommunications among federal organizations is the National Telecommunications and Information Agency (NTIA).
- ☉ As an Air Force organization, CAP radio communications fall under this authority.



Federal Communications Commission (FCC)

- ⦿ The federal agency responsible for the regulation and coordination of telecommunications among **non-federal** agencies is the Federal Communications Commission. Amateur radio falls under this category.
- ⦿ CAP is specifically prohibited from planning the use of frequencies in the Amateur Radio Service also known as ham radio.
- ⦿ Use of Citizens Band to conduct CAP business, including SAR/DR operations, is also prohibited.
- ⦿ Family Radio Service equipment (FRS) may be used for training purposes as well as crowd control at public events. Some limited use at training bases may be approved by the Incident Commander.

Loss of Communications Privileges

- ☼ For reasonable cause, a wing or higher commander may terminate the privileges of any CAP member in his command to participate in CAP radio activities.



Frequencies & Propagation

- ⦿ Not Intended as a physics lesson
- ⦿ Radio works through transmission of electromagnetic radiation from transmitter to receiver



Frequencies & Propagation (cont..)

- ☼ Long Range vs Short Range Communications
- ☼ VHF - FM (fixed, mobile, portable)/AM (aviation)
 - Short distance
 - Line of Sight
 - Repeaters
- ☼ HF - Single Side Band (SSB)
 - Long distance - signal bounces off of ionosphere



Frequencies & Propagation (cont.)

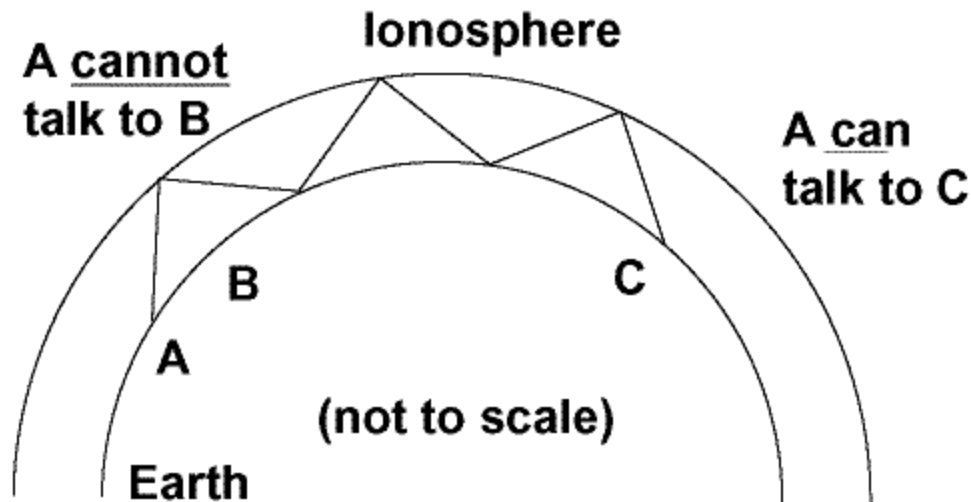
SECTION	FREQUENCY RANGE	PROPAGATION QUALITY	CAP USE
Low Frequency (LF)	300 kHz to 1 MHz	Long distance ground wave	AM radio, LORAN
High Frequency (HF)	1 MHz to 30 MHz	Ground wave and atmospheric bending	Long range communication
Very High Frequency (VHF)	30 MHz to 300 MHz	Line of sight	FM Communication, Aircraft, ELT's & EPIRB's (121.5 MHz, 243 MHz)
Ultra High Frequency (UHF)	300 MHz to 1 GHz	Line of sight	Public safety, Cellular Telephone, ELT's & EPIRB's (406 MHz)

HF - High Frequency

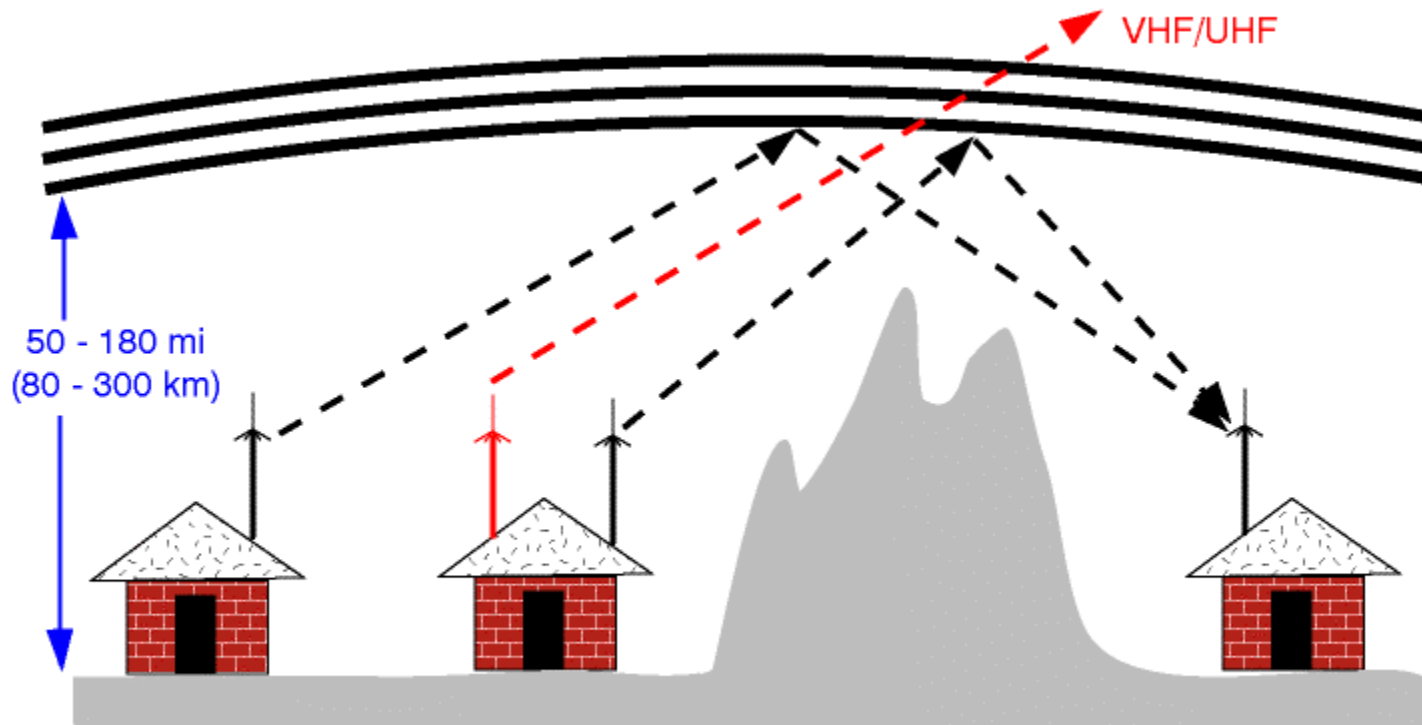
- ☼ Can be long-range skip (cross-country) or medium-range ground-wave
- ☼ Travels long distances, so not normally the best choice for short-range communications
- ☼ In certain conditions, (the ground wave) may be only choice for short-range communications

HF is Long Range

- ☼ Signal is trapped between ionosphere and the ground



HF vs VHF



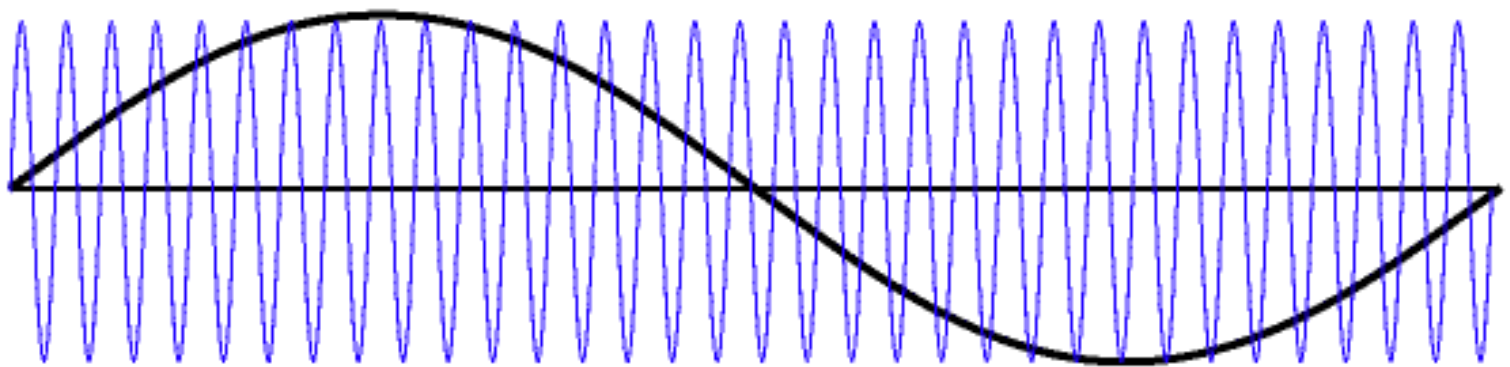
VHF - Very High Frequency

- ☼ Short-range, line-of-sight
- ☼ Allows for multiple conversations on the same frequency, throughout the country, concurrently. (Isolated from each other through distance, mountains, etc.)
- ☼ Provides excellent, dependable, short-range communications which are readily adaptable to ground and air mobile operation.



Comparison of HF and VHF

1 Hz = 1 cycle per second (M = 1 million)



4 MHz HF Signal

148 MHz VHF Signal

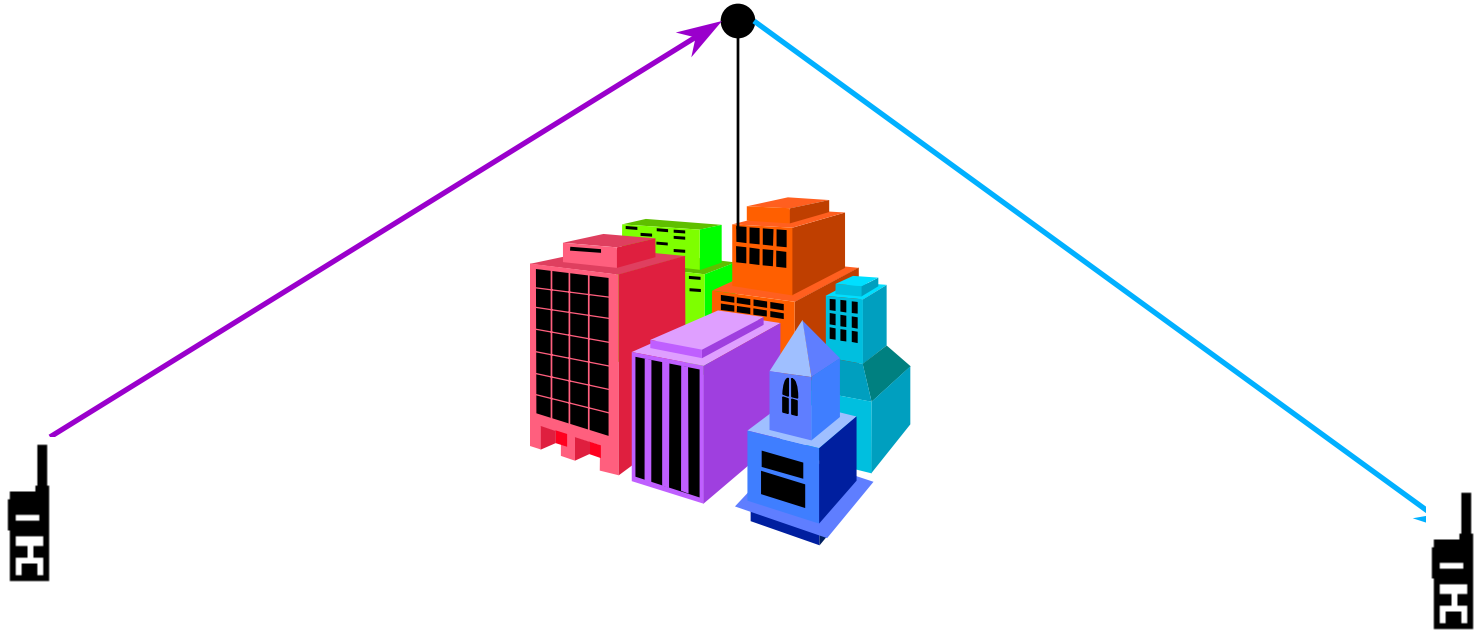
same scale



Selecting a particular repeater

- ☼ Repeaters are activated by PL (Private Line) Tones, a.k.a. CTCSS (Continuous Tone-Coded Squelch System).
 - A subaudible tone system which, when added to a carrier, allows a receiver to "decide" to accept a signal.

Repeater Operation



Repeater increases the range of mobile stations due to its high profile location

Repeater Selection

- ☼ Use the most appropriate repeater for whom you are talking to
- ☼ Don't use a specific repeater as a default
- ☼ Use simplex when able (transmit and receive on the same frequency)



Examples of Repeaters (Horse Mountain)



Radio Types

☼ HF & VHF Radios

- Fixed Stations
- Mobile
- Hand-held (HT = handy talkie)
- Portable (fly away kits)



Radio Controls

- ☼ Power Switch
 - May be integral to volume control
- ☼ Volume Control
- ☼ Squelch (may be automatic)
- ☼ Channel / Mode Select
- ☼ Scan (all channels)



Radio Controls (cont.)

☼ Microphones

- Desktop
- Handheld
- Boom



CAP VHF-FM Radio Operation

☼ Normal Operation Setup Sequence

- Power on
- Set channel - e.g. Channel 1 in display
- Set volume, squelch

☼ Before Transmitting

- **Listen** on Channel -- **don't transmit** if conversation is in progress

☼ To Transmit

- Press *push-to-talk* button (microphone key)
- Hold microphone about 1" from mouth
- Speak in a normal tone of voice
- Release button to listen



CAP Call Signs

- ☼ Tactical call signs
 - Yosemite 550
 - CAPflight 446
- ☼ Functional call signs
 - Mission Base
 - Ground Team 1
 - High Bird

CAP Tactical call signs

- ☼ Composed of a word or short phrase, which identifies the wing or region, followed by a number, which uniquely identifies an individual, unit, or station.
- ☼ California Wing uses the word **Yosemite** for all CAWG stations. **Yosemite 550** can be the call sign of an individual, unit, or station assigned by CAWG.



CAP Tactical call signs (cont.)

☼ Other examples you may encounter include:

- AZ - Red Rock
- NV - Silver State
- OR - Beaver Fox
- UT - Uncle Mike
- PCR - Western
- SWR - CAP West
- RMR - Aspen Gold

Functional Call Signs

- ☼ Based on specific aspect of mission
- ☼ Location
 - Mission Base (**Gillespie Base**)
 - Mission Comm
 - Gillespie Comm
- ☼ Unit function
 - Ground Team (**Ground Team 1**)
 - Comm Center
 - Remote Relay



Staff assignment of call signs

- ☼ Wing or Region (not group or squadron):
 - 1 Commander (**Yosemite 1** , **Western 1**)
 - 2 Vice Commander
 - 3 Chief of Staff
 - 4 Director of Communications
 - 5 Chaplain

Calling A Station

YOU are Yosemite 527, calling Yosemite 550

STATION CALL -----

“Yosemite 550, THIS IS Yosemite 527, OVER”

RESPONSE -----

“Yosemite 527, THIS IS Yosemite 550, OVER”



Emergency Locator Transmitters

- ELTs transmit on 121.5 MHz, 243 MHz, 406 MHz
- **Preferred** practice ELT frequency is **121.775 MHz**
- Other agencies may still use older 121.6 MHz
- Practice beacon use on any authorized frequency other than 121.775 MHz requires notification of three different FAA offices prior to use.
- Emergency Position Indicating Radio Beacon (EPIRB) is used in boats.

ES Mission Communications

- ☼ Communicators are needed for all ES missions in CAP, including SAR, Disaster Relief and SAREX.
- ☼ Additional training is required to achieve a Mission Radio Operator emergency services rating. This training is outlined in CAPR 60-3.

Emergency Operations

✿ Aircraft

- Expected on 121.5 MHz or 243.0 MHz (especially ELT)
- Voice transmissions may occur on any frequency

✿ General CAP

- Any Frequency authorized in CAPR 100-1

Emergency Operations (cont.)

☼ Prowords (pronounced three times)

- MAYDAY
 - International **Distress** Signal; indicates traffic concerning **imminent and grave danger** to life and property
- PAN
 - International **Urgency** Signal; identifies very urgent information concerning the safety of lives and property
- SECURITÉ
 - International **Safety** Signal; identifies urgent information regarding safety of navigation to vessels

Emergency Operations (cont.)

☼ What to do ?

- **LISTEN**

- LISTEN

- LISTEN

- Make notes as to station ID , problem and location
- Transmit only if you are best able to assist
- If no one else responds, you **ARE** the best able to assist

Prowords

- ☼ In order to create a standard terminology for CAP communicators, a set of prowords has been defined that are to be used whenever they are appropriate. Common examples of prowords are: over, affirmative, out, say again and roger.
- ☼ *Refer to your CAPR 100-1, Vol. 3*

Phonetic Alphabet

A	ALFA	(AL fah)	N	NOVEMBER	(no VEM ber)
B	BRAVO	(BRAH voh)	O	OSCAR	(OSS cah)
C	CHARLIE	(CHAR lee)	P	PAPA	(PAH pah)
D	DELTA	(DELL tah)	Q	QUEBEC	(kay BECK)
E	ECHO	(ECK oh)	R	ROMEO	(ROW me oh)
F	FOXTROT	(FOKS trot)	S	SIERRA	(see AIR ah)
G	GOLF	(GOLF)	T	TANGO	(TANG go)
H	HOTEL	(HO tell)	U	UNIFORM	(U nee form)
I	INDIA	(IN dee ah)	V	VICTOR	(VICK tah)
J	JULIET	(JEW lee ett)	W	WHISKEY	(WISS key)
K	KILO	(KEY loh)	X	XRAY	(ECKS ray)
L	LIMA	(LEE mah)	Y	YANKEE	(YANG key)
M	MIKE	(MIKE)	Z	ZULU	(ZOO loo)

Pronunciation of Numbers

<u>Digit</u>	<u>Spoken As</u>	<u>Example</u>	<u>Spoken As</u>
0	ZE-RO	10	WUN ZE-RO
1	WUN	19	WUN NIN-ER
2	TOO	42	FOW-ER TOO
3	THU-REE	30	THU-REE ZE-RO
4	FOW-ER	146	WUN FOW-ER SIX
5	FIFE	500	FIFE HUN-DRED
6	SIX	1476	WUN FO-WER SE-VEN SIX
7	SEV-EN	7100	SEV-EN WUN HUN-DRED
8	AIT	18000	WUN AIT THOW-ZAND
9	NIN-ER	81298	ATE WUN TOO NI-NER ATE

Formal Net Schedule

☼ HF CAWG, Channel 1, USB

- 0830 & 2000 Hrs local, Monday through Friday

☼ VHF

- Northern California
 - Monday Wednesday Friday
 - @ 2100 local, Mt. Diablo Repeater
- Southern California
 - Monday through Friday
 - @ 1900 local, Santiago Repeater

Operation Practice

- ☼ Do What You Have Learned
- ☼ Remember -
 - **Listen First**
 - **THINK**
 - Push-to-Talk
 - Talk
 - Release to Listen

Future Steps

- ☼ Continue to Learn By Doing
- ☼ Advanced Communication User Training (A-CUT)
- ☼ Emergency Services Qualifications
 - Most require B-CUT
 - Some require A-CUT
 - Ref.: CAPP 214

Summary

- ✿ CAP communications
- ✿ NTIA and FCC
- ✿ Radio communication theory
- ✿ Fundamental repeater theory and operation
- ✿ Radios used in CAP communications
- ✿ Radio controls
- ✿ Call signs
- ✿ Emergency locator transmitters
- ✿ Mission Communications and Emergency Operations
- ✿ Prowords, Phonetic Alphabet and Numerals
- ✿ Net Operations
- ✿ Correct operation of a radio





Are there
any
questions?



The End